

ION SEPARATION AND REMOVAL UNIT WITH GAS EXTRACTION**ABSTRACT**

This invention is applied to any ionized solution of dissolved solids and electrolytes, such as sea water, which is forced through a conduit equipped with a magnetic wall of rectangular cross-section, which induces a magnetic field, where ions separate when passing through according to magneto-hydrodynamic physics. The conduit is made up of one continuous magnetic wall, a spiral or similar, with opposite magnetic poles on each side, where these both sides co-operate to extend magnetic fields with parallel wall in the same direction through the whole conduit. The ionized solution is pumped into the center of the spiral and further out through the spiral or similar. The charged ions in the flow stream are deflected laterally towards the open ends and as separated positive or negative ions into chambers outside the conduit. The ions concentrating in each chamber influence an electric tension acting similar to a capacitor, which counteracts the magnetic field movement of the ions but is released by short-circuiting the electrodes placed in each chamber to discharge the ions thus inducing a useful current. With the discharge of ions gases are produced and trapped in cylindrical collectors. The spiral outlet is divided into cells to control and to adjust the degree of de-ionization. An additional power source connected in series with the electric circuit increases the rate of de-ionization and speeds up ion discharge and gas output. The effluents have a controlled speed outflow from both chambers into drainpipes.